

# Injections in Sports Medicine



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# Objectives



- Review the indications, benefits, risks, and contraindications of injections in Family Medicine.
- Describe general principles involved in administering injections to include consent, equipment, anesthesia, choice of corticosteroid and technique.
- Discuss basics of coding for the procedure.

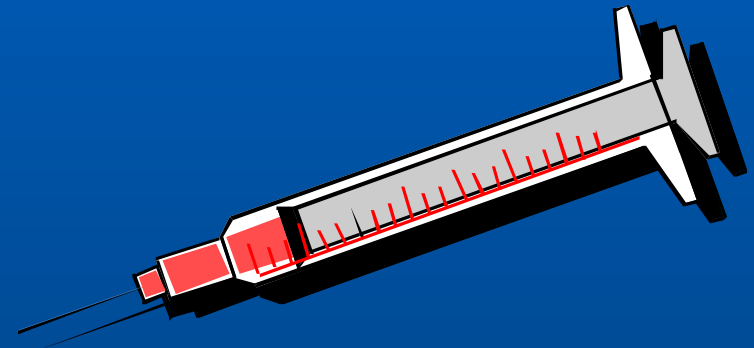


# Indications



- Therapeutic:

- injection of corticosteroids (CSI) or other intra-articular therapies
- remove tense effusions



- Diagnostic:

- synovial fluid analysis
- therapeutic trial
- MR arthrography

# Risks/Complications



- Infection: one infection per 20,000 to 50,000 injections.
- Local trauma
- Hyperglycemia (CSI)
- Cartilage degeneration? (CSI)
- Chondrotoxicity? (anesthetics)





## Adverse Effects of Local Corticosteroid Therapy<sup>1</sup>

Complication	Estimated Prevalence
Postinjection flare	2 to 5%
Steroid arthropathy	0.8%
Tendon rupture	<1%
Facial flushing	<1%
Skin atrophy, depigmentation	<1%
Iatrogenic infectious arthritis	<0.001 to 0.072%
Transient paresis of injected extremity	Rare
Hypersensitivity reaction	Rare
Asymptomatic pericapsular calcification	43%
Acceleration of cartilage attrition	Unknown

# Contraindications



- Cellulitis or broken skin at entry site
- Anticoagulation or a coagulopathy
  - Relative
- Intra-articular fractures
  - relative
- Septic effusion (tx)
- Lack of response to prior injections
- More than three prior injections in the last year to a weight bearing joint.
- Inaccessible joints
  - SI, hip w/o guiding imagery
- Prosthetic joints



# General Principles



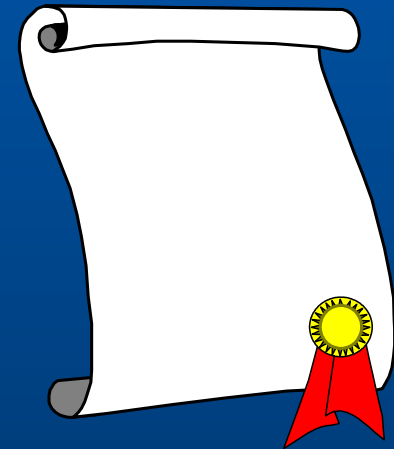
- Consent
- Equipment
- Anesthesia
- Corticosteroids
- Technique
- Post-Procedure Care



# Consent



- At least Verbal Consent should be obtained/documentated on all injections
  - discuss benefits, risks and expected results





# Equipment



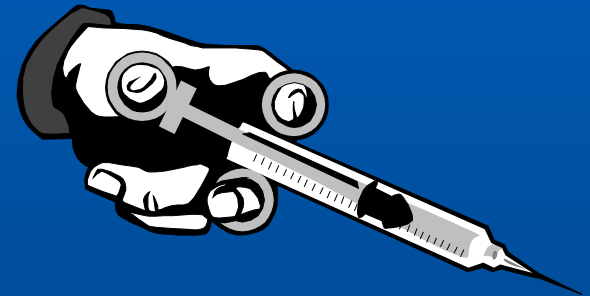
- Controversies:
  - sterile prep vs. alcohol prep
  - sterile gloves vs. nonsterile
- 20 to 27 gauge needles for injections; 18 to 20 gauge for aspirations
- 1 to 10cc syringes for injections; 3 to 50cc for aspirations
- ethyl chloride, 1 and 2% lidocaine, 0.5% bupivacaine
- sponges, Band-Aids
- access to equipment for allergy/anaphylaxis



# Anesthesia Options (ask your patient)



- Nothing
- Ethyl chloride, “cold spray”
- Lidocaine: 1% to 2%;
  - 1 to 2 min onset of action;
  - duration 1 hr.
- Bupivacaine: 0.25 to 0.5%;
  - 30 minute onset of action;
  - duration 8 hr
- Nerve block



# Anesthesia



- Anesthetics work by causing a reversible block to impulse conduction along nerve fibers.

Loss of Pain  
Sensation



Loss of All  
Sensation



Loss of Motor  
Power

As Dose of Local Anesthetic Increases



# Corticosteroids



- Mechanism of Action: complex and largely unknown, however, they do:
  - Reduce cytokines and inflammatory mediators;
  - Decline in PMN migration
  - Nerve pain modulation?
- “Treats pain, doesn’t heal tissue”
- More soluble (dexa, beta) → shorter duration
  - ? Better for soft tissue
  - ? Less skin atrophy
- Less soluble (triam, m-pred) → longer duration
  - ? Better for joints

# Corticosteroids



Corticosteroid	Relative Potency (cortisone = 1)	Solubility	Preparations
Triamcinolone acetate (Kenalog)	5	Less	10 mg/ml 40mg/ml
Methylprednisolone acetate (Depo-Medrol)	5	Less	40mg/ml
Betamethasone acetate (Celestone Soluspan)	25	More	4 mg/ml 6mg/ml
Dexamethasone	20-30	More	4mg/ml



# Hyaluronic Acid Derivatives



- FDA-indicated only for treatment of knee OA but works in GH and Hip
  - Hylan G-F20 polymers (SynviscOne):
    - Heavy weight preparation
    - One-time injection
  - Sodium Hyaluronate (Hyalgan)
    - 3-5 weekly injections
  - Bacterial fermentation products
    - Euflexxa, etc.
    - 3 weekly injections



# Hyaluronate derivatives:

## MOA



- Slight anti-inflammatory effect
- Gone from IA space within few days
- Stimulates chondrocytes to produce HA
- Increases viscosity of synovial fluid
- Decreases pain, increases function
- Contra-indications
  - Usual injection c-i's
  - Avian -derived (Synvisc, Hyalgan, Orthovisc, etc): CAUTION if allergy to feathers, eggs, avian protein



# Knee Joint Viscosupplements



- Effective in knee (LOE 1a)
- Delayed effect (1-3 weeks)
- Long duration (6 months)
- Weekly injections, 3-5x
  - SynviscOne: one-time injection
- May delay need for joint replacement





# Mixing



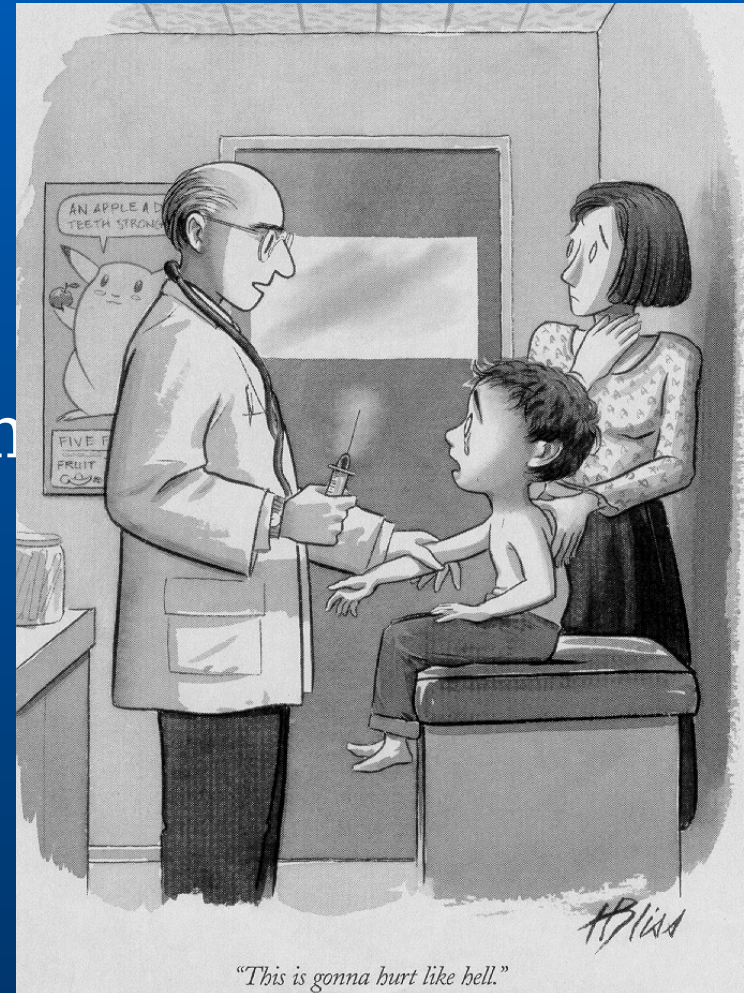
- First, draw the anesthetic into the syringe;
- Second draw the corticosteroid into the syringe;
- Next draw 1cc of air into the syringe to create a “mixing bubble”;
- Prior to injection, mix the agents, and then expel the air prior to injection.



# Technique



- Patient
- Be prepared!
- Landmarks
- Aseptic vs. Sterile technique
- Local anesthesia
- Needle insertion
- Delivering the volume:
  - bolus vs. peppering



# Ultrasound Guidance



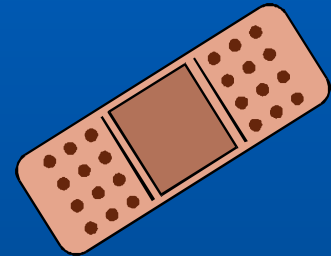
- Accurate needle tip placement
- Minimize neurovascular damage



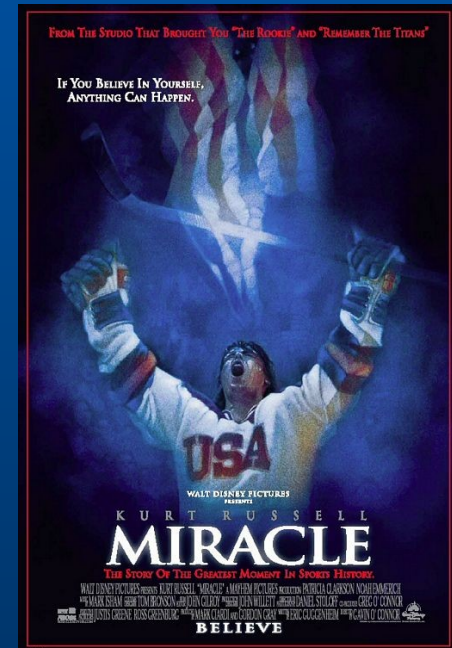
to effe



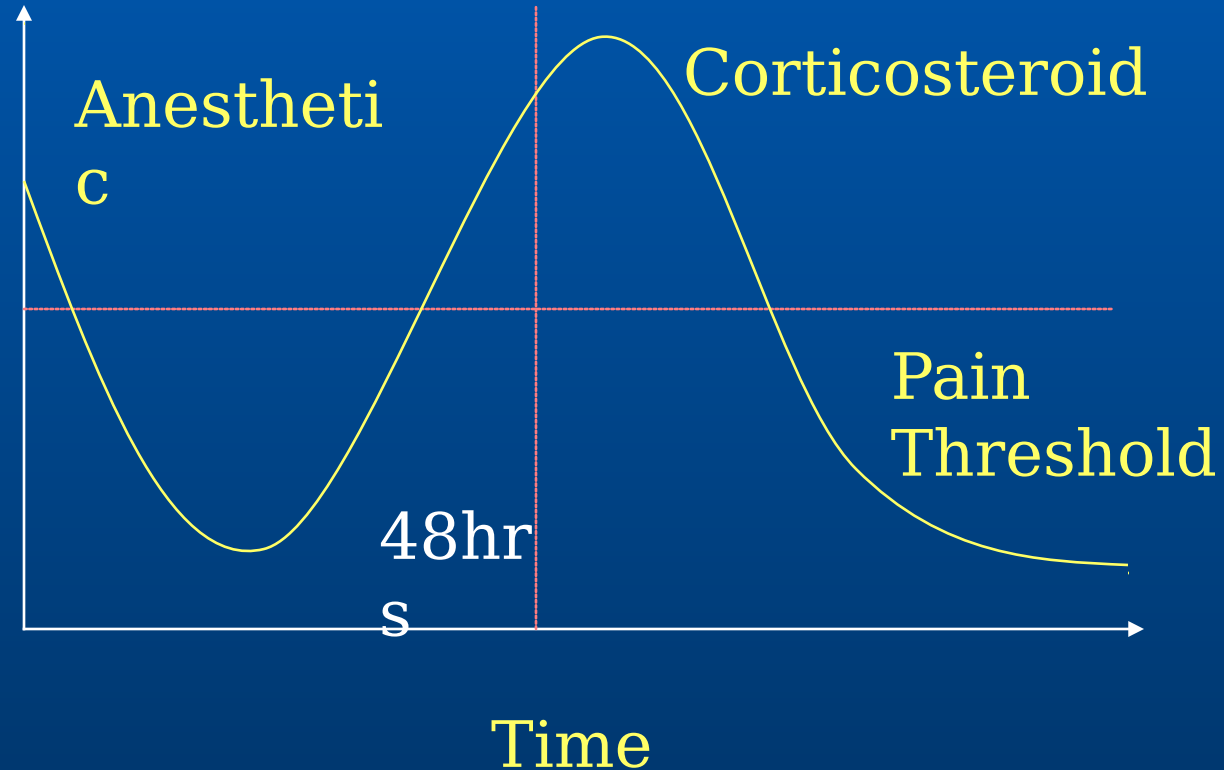
# Post-Procedure Care



- Evaluation of patient relief in the office: “What % is gone?”
- Discussion of steroid effects/expectations
- Afterpain treatment
  - Ice vs. short course NSAID
- Activity Recommendations
  - Rest weight bearing joints for several days to a week.
- Follow-up visit!



# Pain Relief and Injection Therapy





# Post-Injection Flare vs. Infection



- **Post-Injection Flare:**
  - Reaction caused by development of steroid crystals or preservatives
  - Occurs 6 to 24 hrs s/p injection; may last 2 to 4 days.
  - Consider aspiration to r/o infection if persists >4 days.
- **Infection:**
  - RARE
  - Symptoms persist over 72 hrs.
  - Warmth, redness, streaking, fever.
  - Confirmed by aspiration.



# Injection Frequency



- No EBM guidelines.
- General Recommendations:
  - Limit injections to large joints to 4 times per year; no more than 10 times overall.
  - Small joints should be injected no more than three times per year and four times overall.
  - Steroid injections should be spaced at least 4 weeks apart; hyaluronan series 6 months apart.



# Coding



- Reimbursement requires clinicians properly identify two, possibly three, appropriate codes:
  - The Diagnosis:
    - International Classification of Diseases, 9<sup>th</sup> Revision ICD-9
  - The Procedure:
    - Current Procedural Terminology CPT
  - The Drug Utilized:
    - "J" Code
- Evaluation and Management (E/M) Codes are dependent upon New patient status.

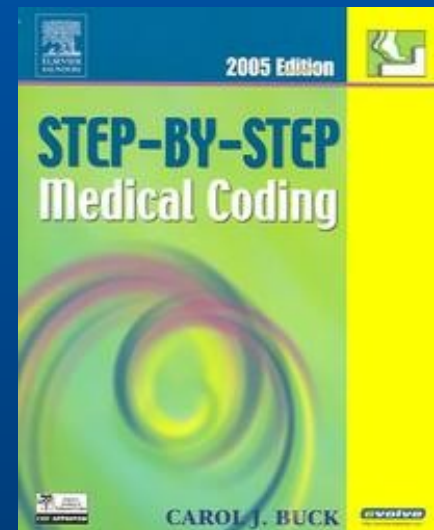




# Coding – “CPT” Codes



CPT	Description	RVU
20526	Inj of Carpal Tunnel	1.77
20550	Inj tendon sheath/ligament	1.57
20551	Inj tendon origin/insertion	1.51
20552	Inj sing/mult trigger pts (1-2 muscle grps)	1.38
20553	Inj sing/mult trigger pts (>3 muscle grps)	1.56
20600	Asp/Inj small joint (e.g.fingers)	1.38
20605	Asp/Inj intermediate joint (e.g.fingers)	1.52
20610	Asp/Inj large joint (e.g.fingers)	1.84
20612	Asp/Inj ganglion cyst	1.53



# Coding – “J” Codes



## “J” Codes for Injectable Corticosteroids



J Code	Material	Unit
J3301	Kenalog	10mg
J1020	Depo-Medrol	20mg
J1030	Depo-Medrol	40mg
J1040	Depo-Medrol	80mg
J0704	Celestone	6mg
J1094	Decadron LA	1mg
J7320	Synvisc	16mg
J7315	Hydrol	20



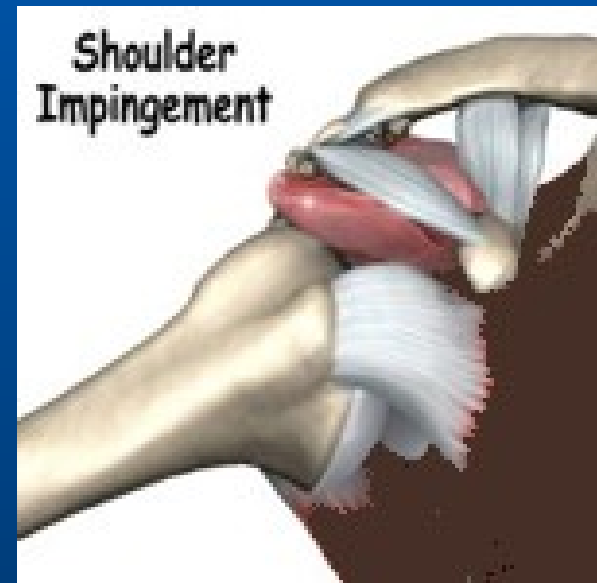
# Shoulder Injections

# Subacromial Space



- **Indications:**

- Therapeutic: relief of pain in subacromial impingement syndrome
- Diagnostic: r/o relative contributions from other pathology
  - GH jt dz
  - AC jt dz
  - rotator cuff tears



# Subacromial Injection

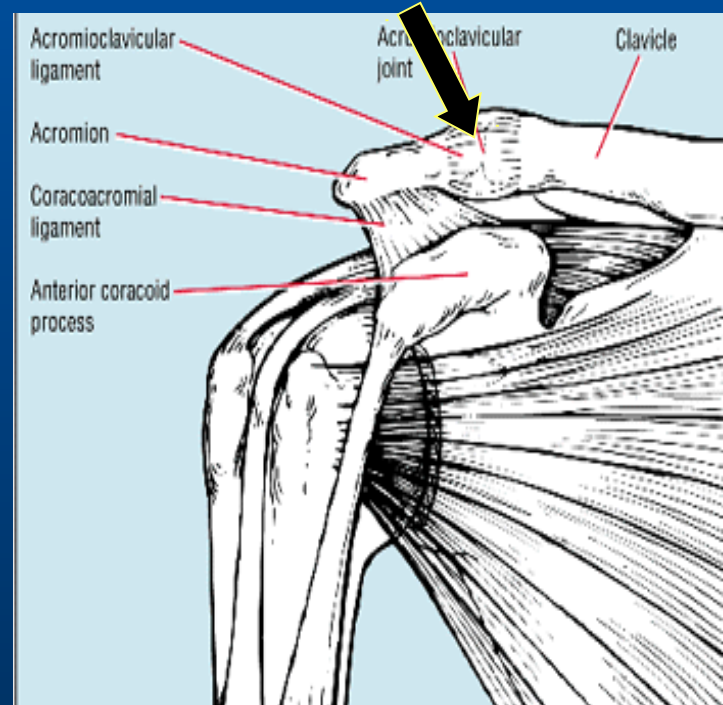
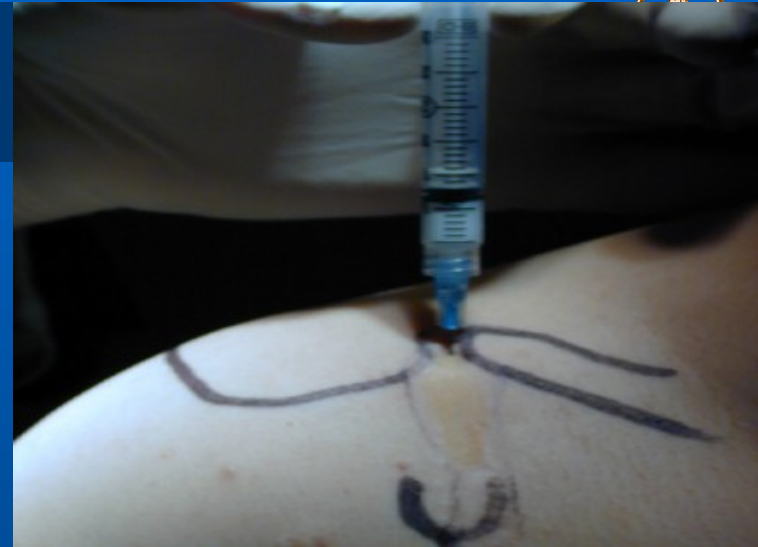


- 5-9cc 1% lidocaine
- Triam 10-40 mg
- 22-27g needle
- Postero-laterally
- Target: tip of needle under middle of acromion
- Wait 10 minutes for result
- >50% pain reduction confirms



# AC Joint Injection

- **Indications:**
  - Th: AC degenerative disease
  - Dx: evaluation of AC pathology as an etiology for shoulder pain
- **Needle size and dosage:**
  - 22-27 gauge needle
  - 1 ml of 1% lidocaine w/
    - Triam 10 mg



# Glenohumeral Joint Injection



- **Indications:**
  - Steroid: Arthritis (Inflammatory or Degenerative), Adhesive Capsulitis
  - Viscosupp: OA (decent evidence)
- **Needle size and dosage:**
  - 1 ½- 2 inch, 22-25 gauge needle
  - 2-3 ml of Anesthesia
  - Triam 20-40 mg

# Glenohumeral Joint Injection



**Approach**

- Posterior joint line  
2 cm inferior to  
postero-lat corner of  
acromion, 1 cm medial

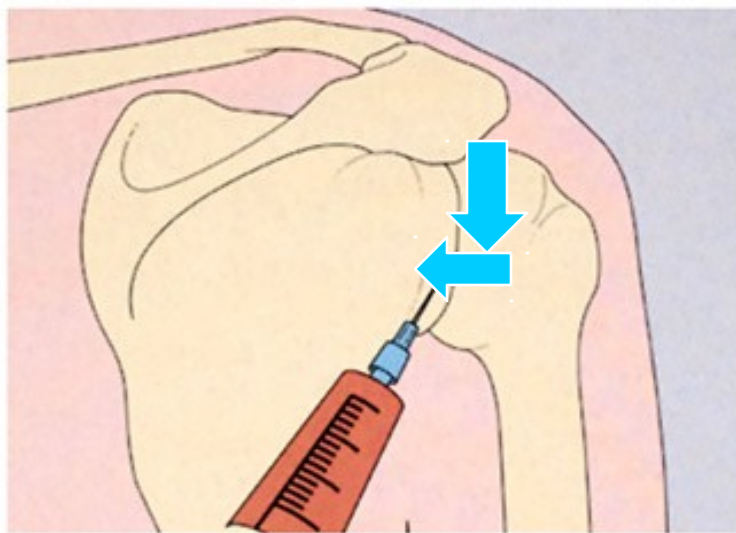
- **“down 2, medially 1”**

- Thumb on joint line,  
finger on coracoid

- Needle horizontal to  
floor

- Aim needle at fingertip  
on **coracoid**

- Enter until hit bone,  
pull back 1mm



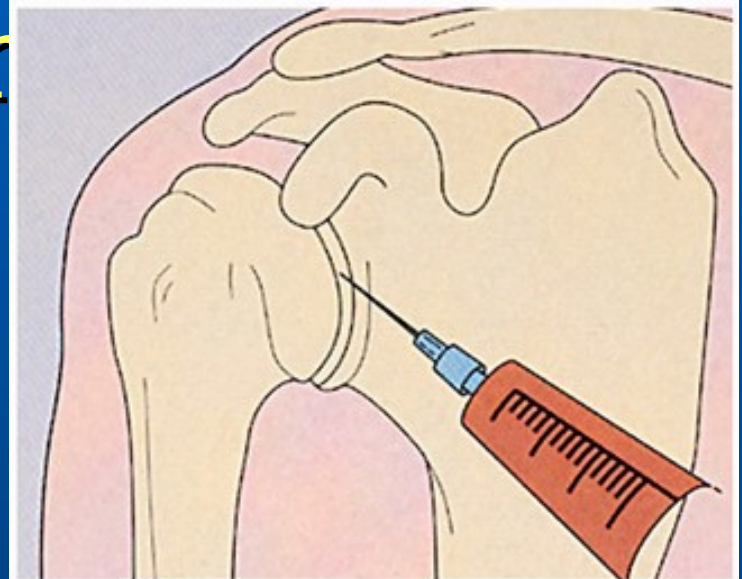


# Gleno-humeral Joint Injection



## Anterior Approach

- CORACOID: go 1 cm inferior, 1 cm lateral
- Needle horizontal to floor
- Direct needle posteriorly, slightly laterally (direction of angle of acromion)
- Touch bone, withdraw 1mm, inject





# Elbow Injections

# Lateral Tennis Elbow



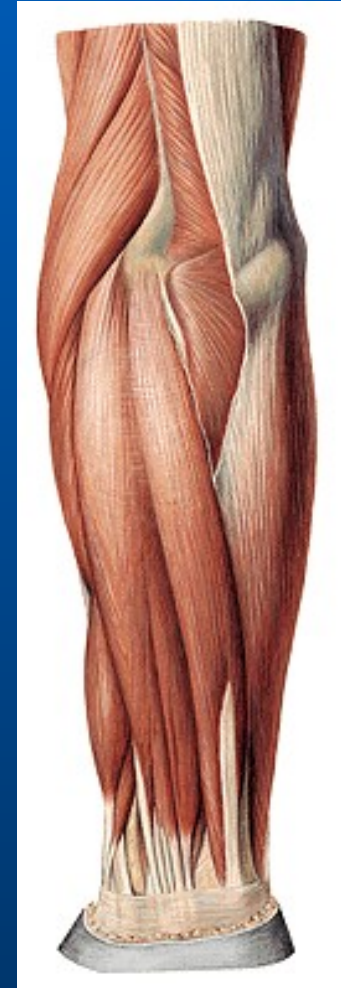
- Indications:
  - lateral epicondylitis (tennis elbow) that fails to improve with conservative therapy



# Lateral Tennis Elbow



- Clinical anatomy/landmarks
  - humeral lateral epicondyle
  - radial head, appreciated by pronation/supination
  - extensor carpi radialis brevis



# Lateral Tennis Elbow



- Technique:
  - Elbow 90 degrees flexion
  - area of maximal tenderness
  - Angle needle proximally; use lat epic as “backstop”



# Lateral Tennis Elbow



- Needle size and dosage:
  - 25 to 27 gauge 1 inch needle
  - 1-2ml lidocaine
  - 2 mg dexa/beta OR
  - 10 mg triam



# Medial epicondylitis



- Same technique, medial side





# Olecranon Bursitis

## Aspiration

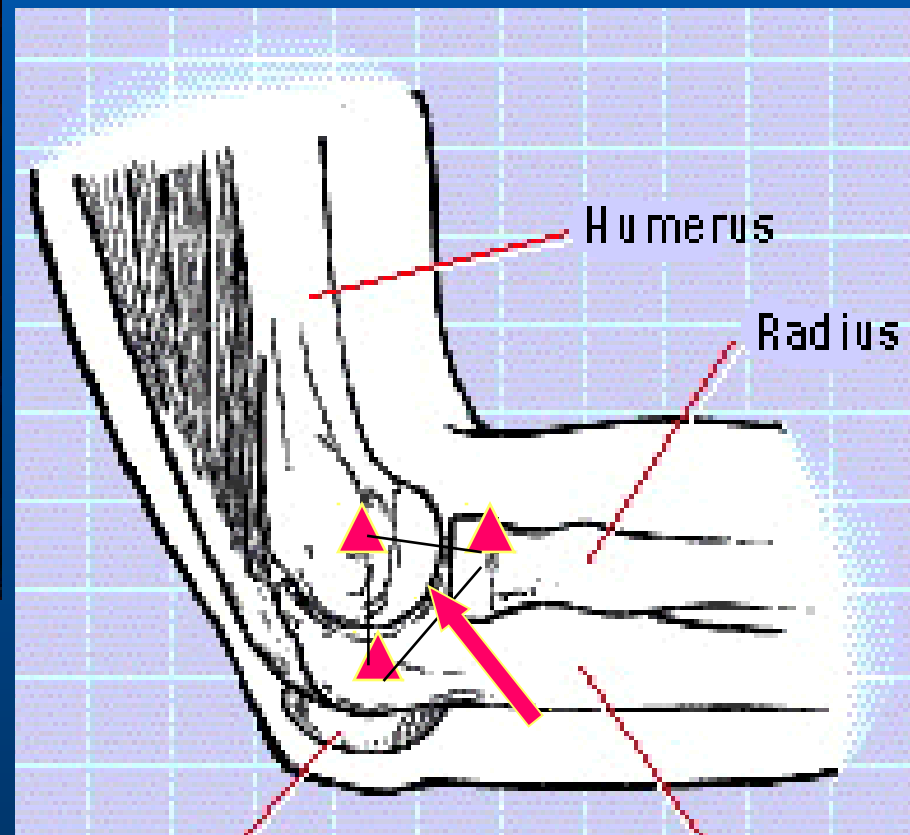
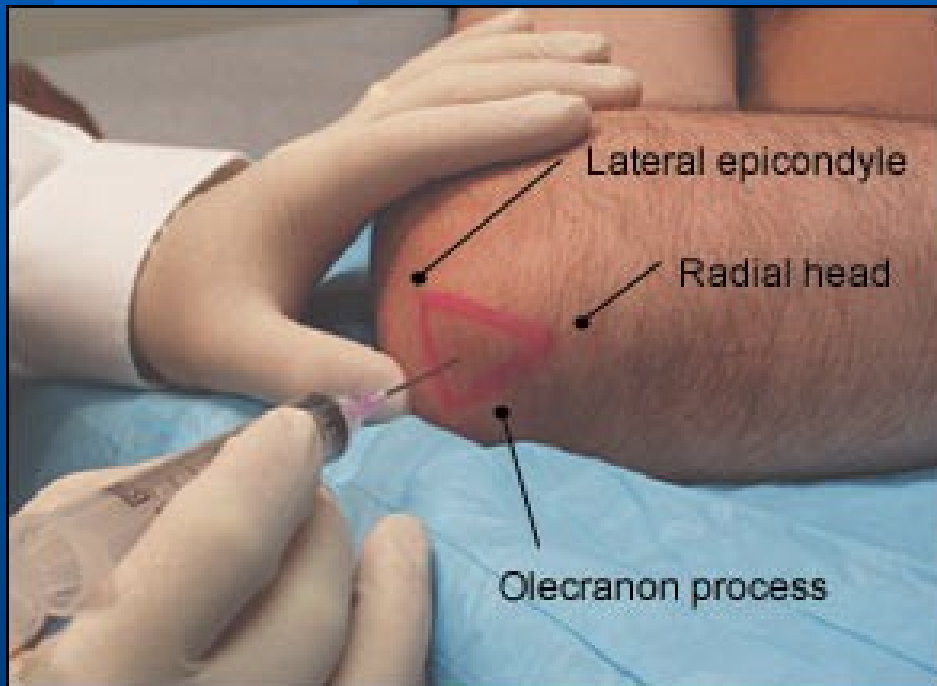


- Prefer compression & protection over aspiration
- Indications
  - Th: Persistent, painful
  - Dx: r/o infection
- Technique
  - Sterile prep
  - 18-20 gauge needle





# Elbow Joint Aspiration





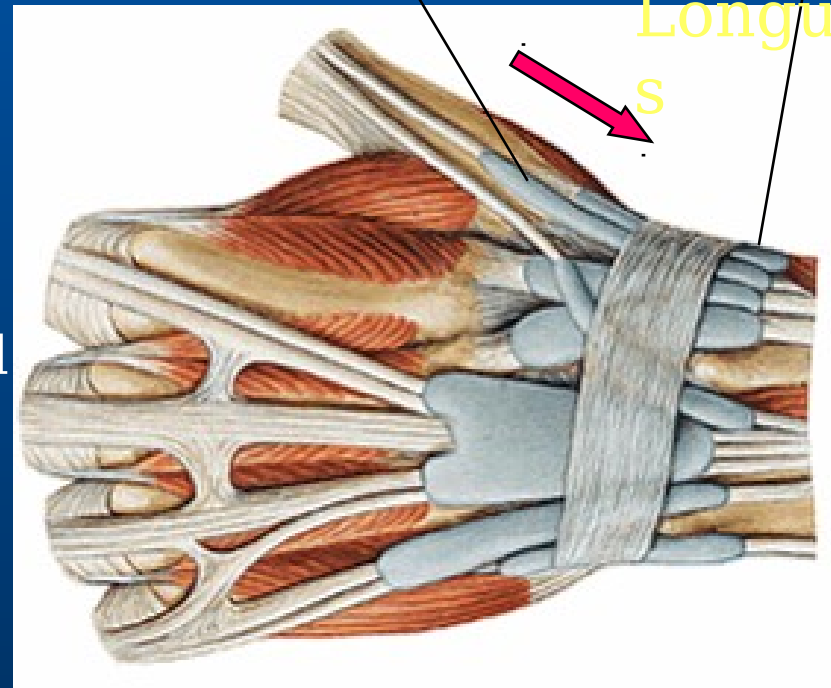
# Hand and Wrist Injections

# deQuervain's Tenosynovitis



Extensor  
Pollicis  
Brevis

Abd  
Pollicu  
s  
Longu  
s



- Indications:

- Initial tx of choice (LOE A)
- Better than splint or NSAID

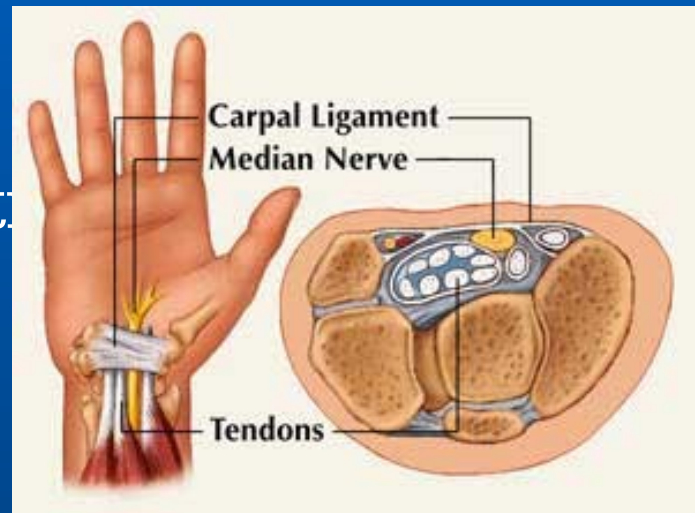
- Needle size and dosage:

- 25 - 27 gauge 1 inch needle
- 1ml Lido w/ 2 mg dexa/beta  
OR Triam 10 mg
  - LOW DOSE to avoid atrophy
- Technique
  - Directly into 1<sup>st</sup> dorsal synovial
  - Distal to proximal
  - Fluid should track proximally

# Carpal Tunnel Syndrome

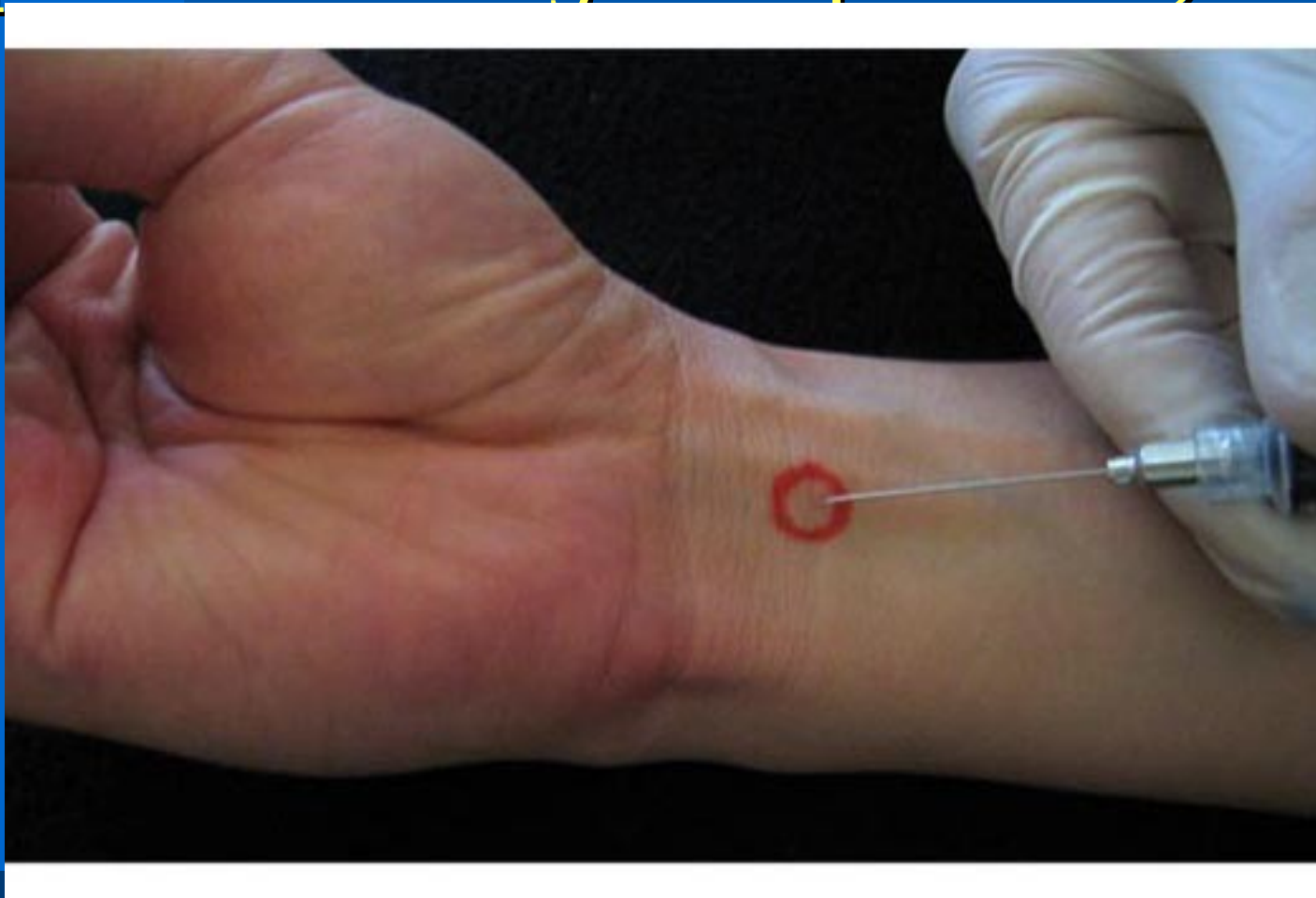


- **Indications:**
  - Recalcitrant to conservative treatment
- **Needle size and dosage:**
  - 25 - 27 gauge 1 inch needle
  - 1ml of Anesthesia w/ 10-20 mg Triam OR 2-4 mg beta/dex
- **Palmar crease**



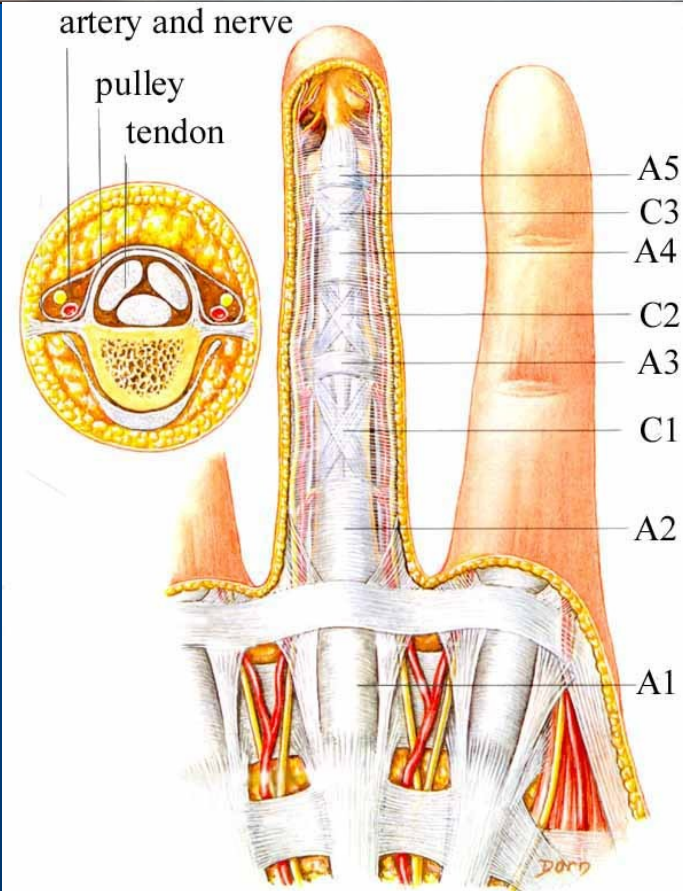
# Carpal Tunnel Injection

Placement: ulnar to FCR (& plamaris longus if present)



# Trigger Finger/Thumb

- Indications:
  - Stenosing Tenosynovitis
- Needle size and dosage:
  - 25 - 27 gauge 1 inch needle
  - 0.5 ml of Lido w/ 10 mg Triam OR 2 mg dexa/beta
- Location: A1 pulley





# 1<sup>st</sup> Carpometacarpal Injection

- Indications:

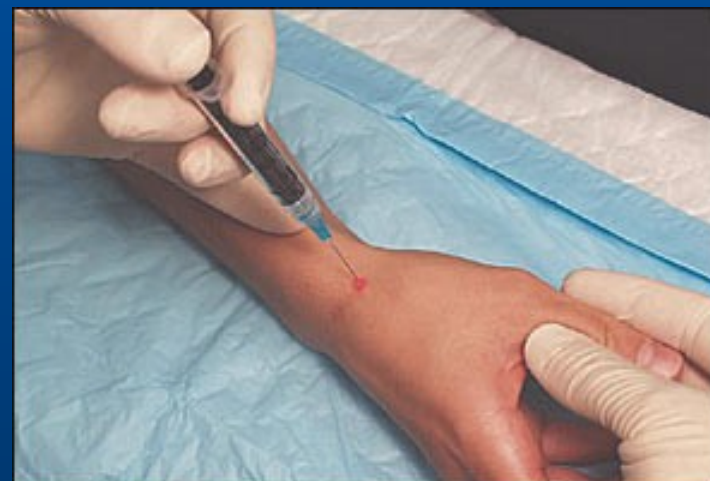
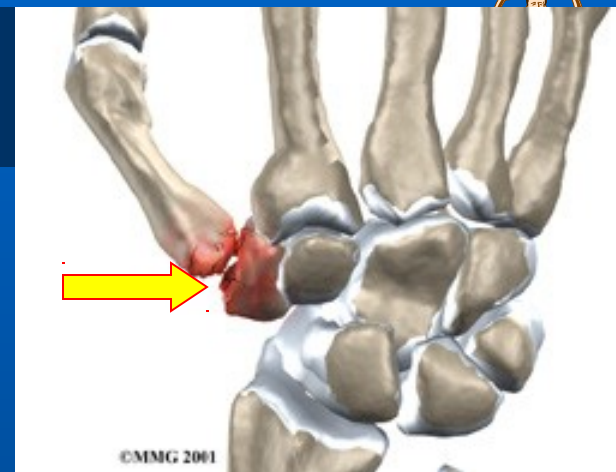
- Th: Pain OA

- Needle size and dosage:

- 25 - 27 gauge 1 inch needle
  - 0.5-1ml of Anesthesia w/ 10 mg Triam OR 2 mg dexa/beta

- Technique:

- Palpate jt space, distal aspect of snuffbox
  - Approach perpendicular to jt space



# Other Wrist Injections

- Ganglion Cyst

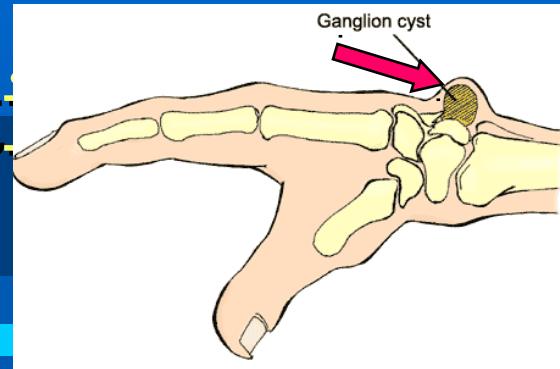
- 18g needle

- Intersection Syndrome

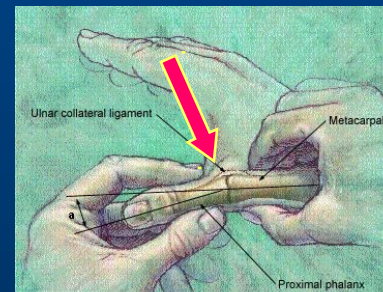
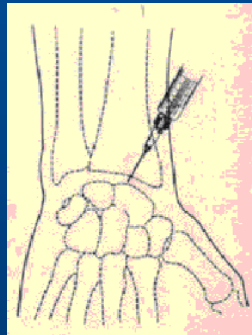
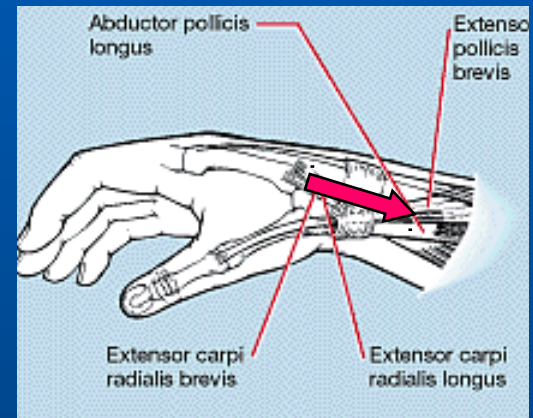
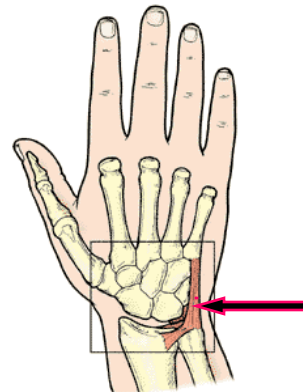
- Triangular Fibrocartilage Complex

- Wrist Joint

- Gamekeeper's Examination



Triangular Fibrocartilage Complex (TFCC) Injuries







# Back and Pelvis Injections

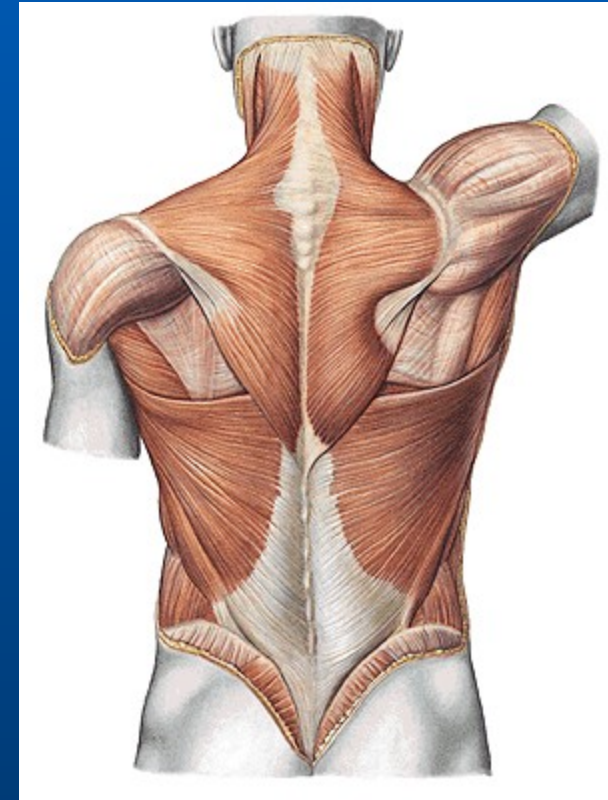
# Myofascial Trigger Points



- **Indications:**

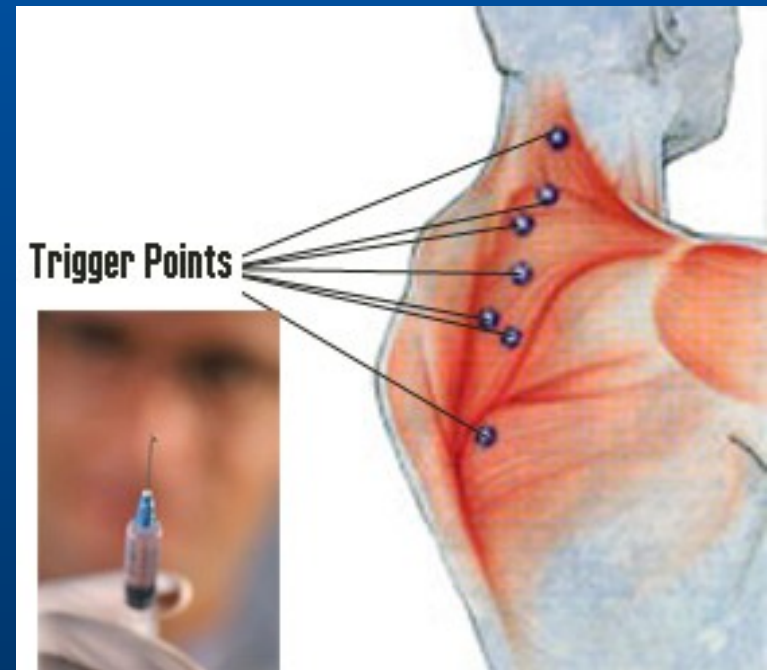
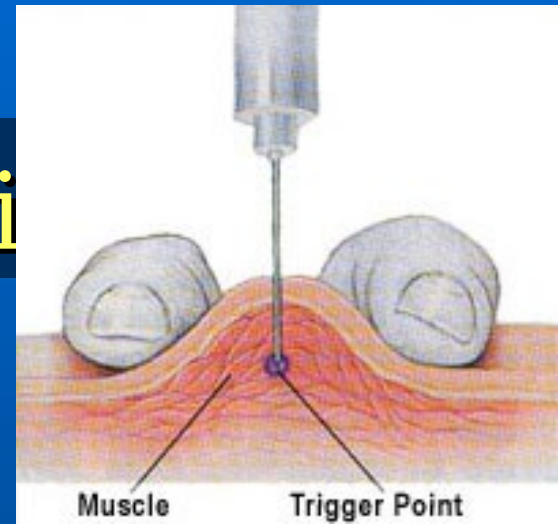
- diagnosis and treatment

of  
myofascial trigger  
points

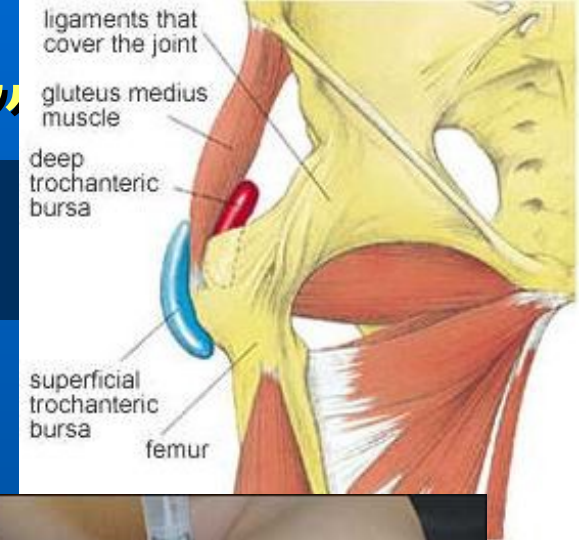


# Myofascial Trigger Points

- Needle size
  - 25-27 gauge
  - 3 ml 1% lido
- Technique:
  - Trap nodule between the fingers
  - sterile prep
  - Needle area a few times
  - two to five weekly sessions may be required



# Trochanteric “Bursitis”



- Indications:

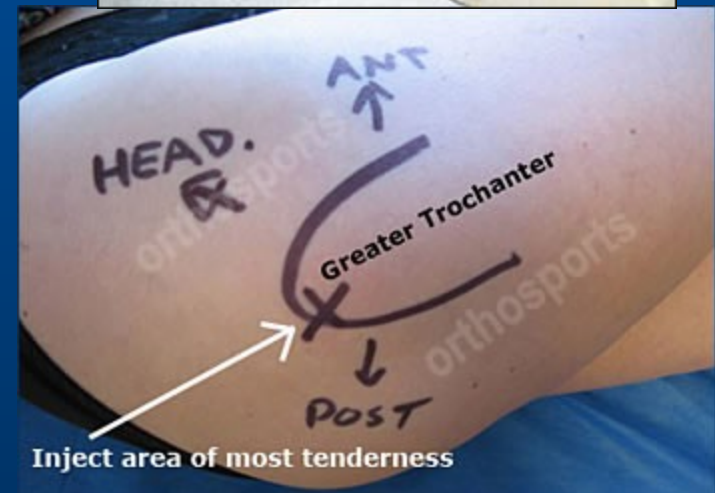
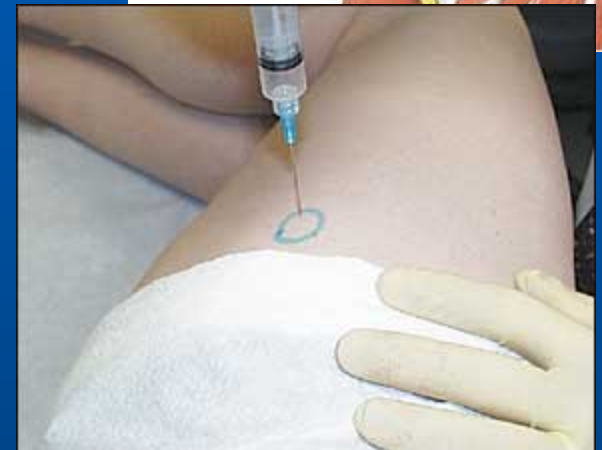
- recalcitrant trochanteric “bursitis” (tendinopathy)

- Needle/medication

- 22-25 gauge needle long enough to reach bone (? spimal)
- 10-40 mg Triam OR

- Technique:

- lateral decubitus position
- point of maximal tenderness
- insert to bone, pull back 1-5mm
- Inject w gentle “peppering” of the bursa





# Knee Injections

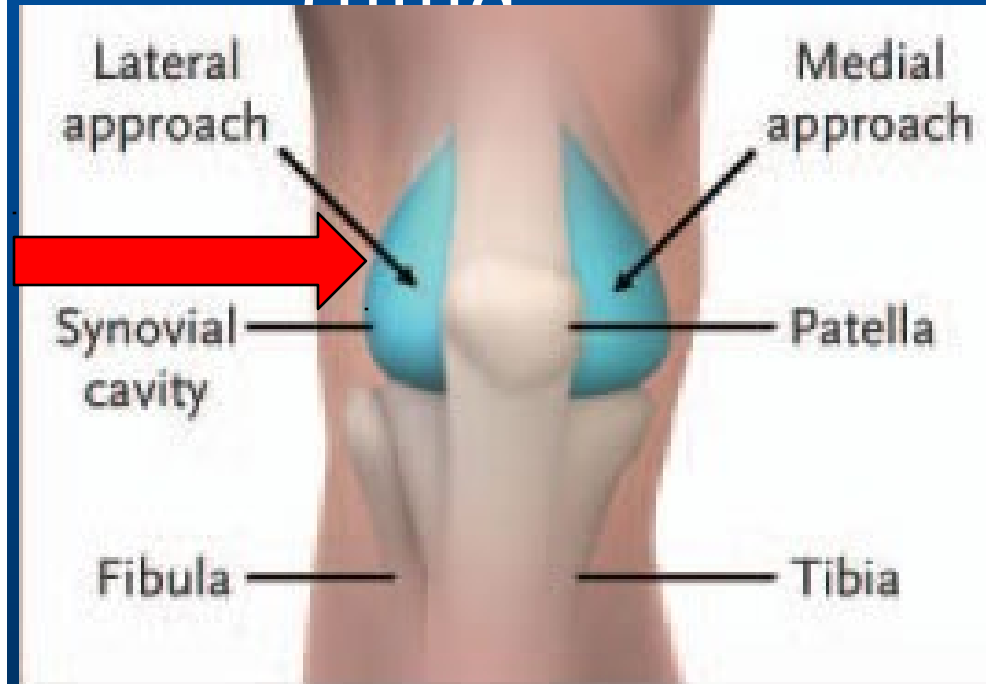
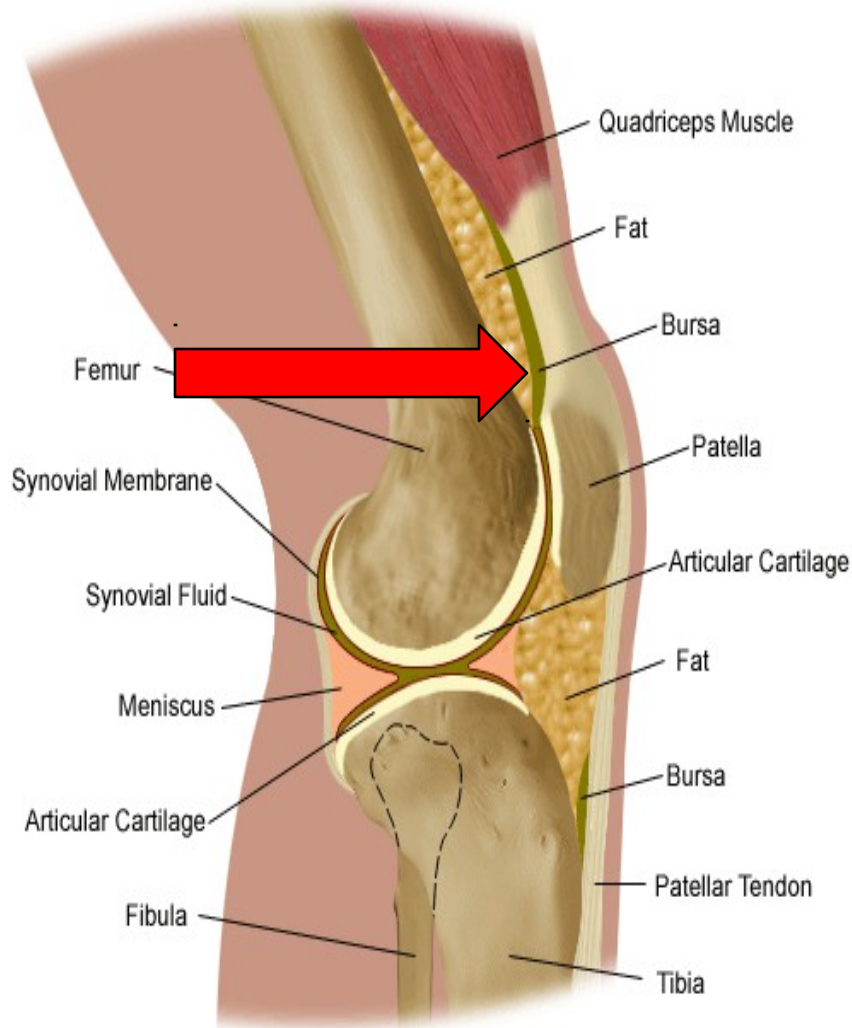
# Knee Effusion Aspiration



- Indications

- Painful, tense
- Improve motion
- Diagnosis (fluid)

Anatomy of the Knee



# Knee Effusion Aspiration

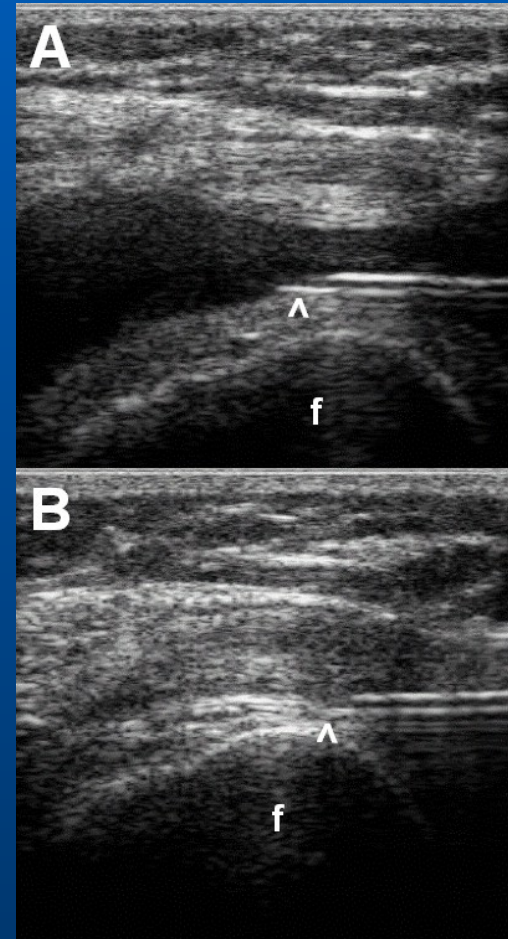


- Pt supine, knee straight
- Lateral approach, just superior to patella
- Needle horizontal to floor, medial
- With enco



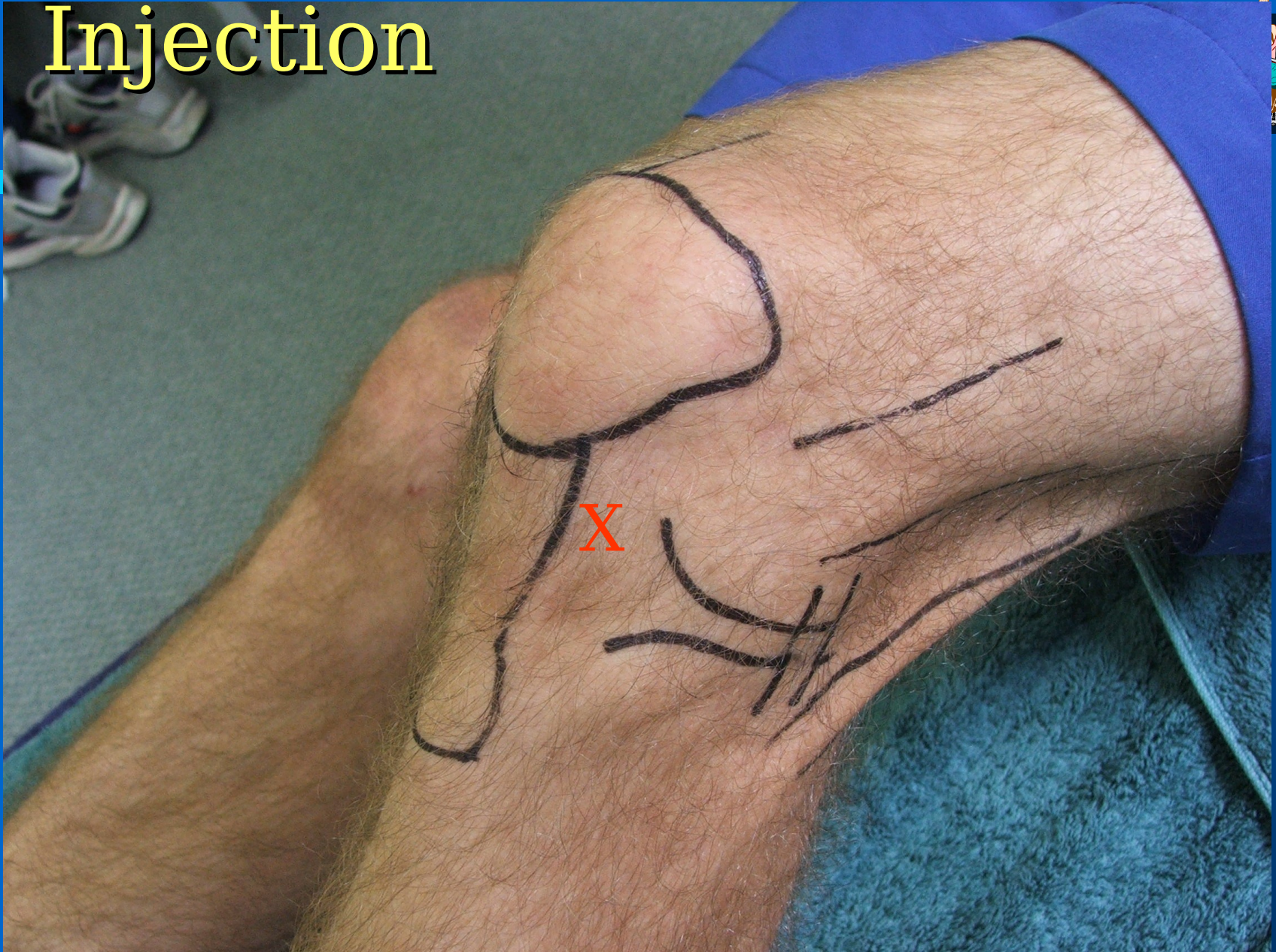


# US-guided Knee Suprapatellar Pouch Aspiration





# Knee Joint Therapeutic Injection



# Seated Knee Injection



- Pt seated, knee bent 90d
- Antero-Lateral joint line, just lateral to pat tendon
- Needle horiz to floor
- DEPTH IS KEY:
  - 1.5-2 inches
  - TARGET: needle tip in center of knee



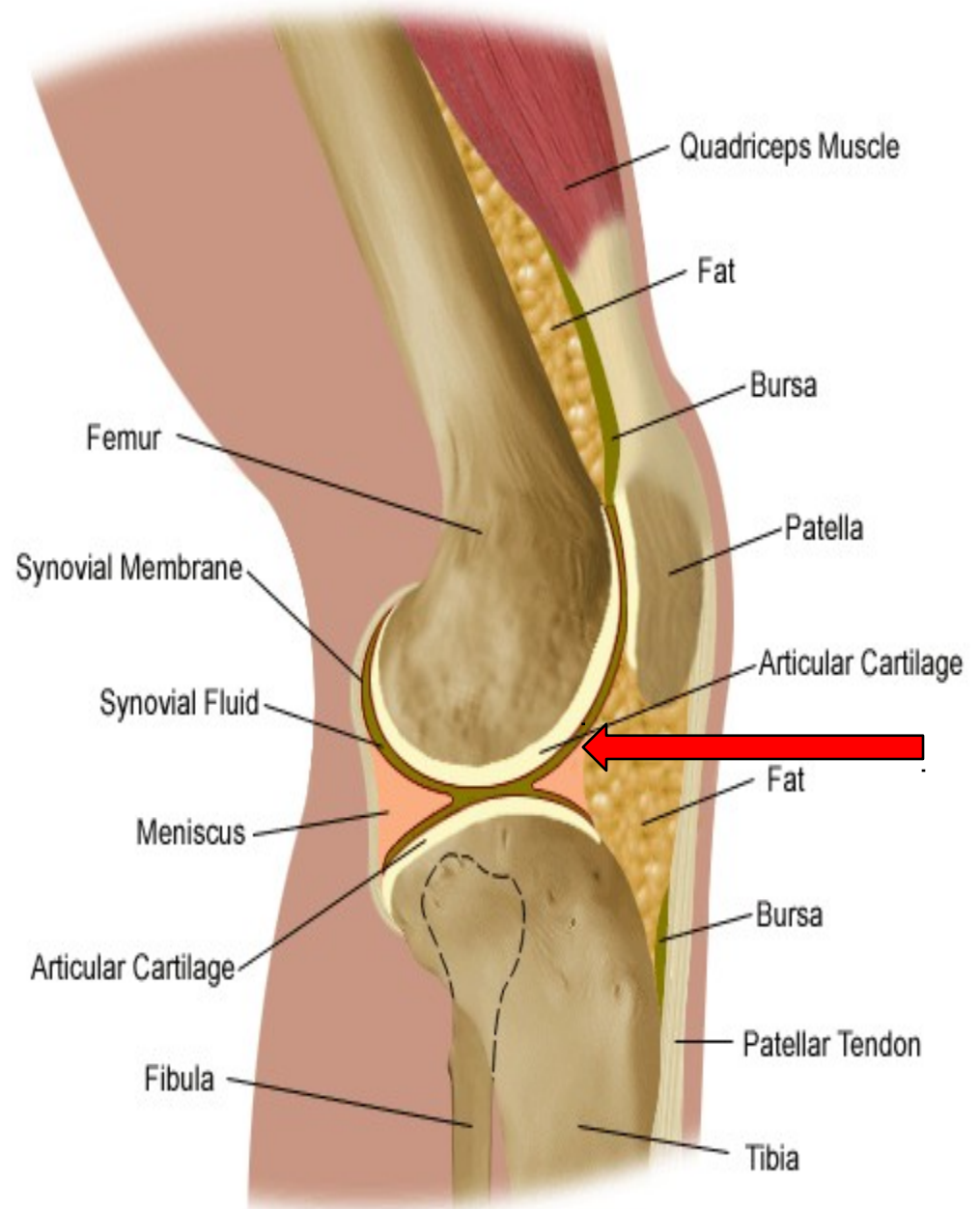


# Why is DEPTH

key?

- Get past fat pad!

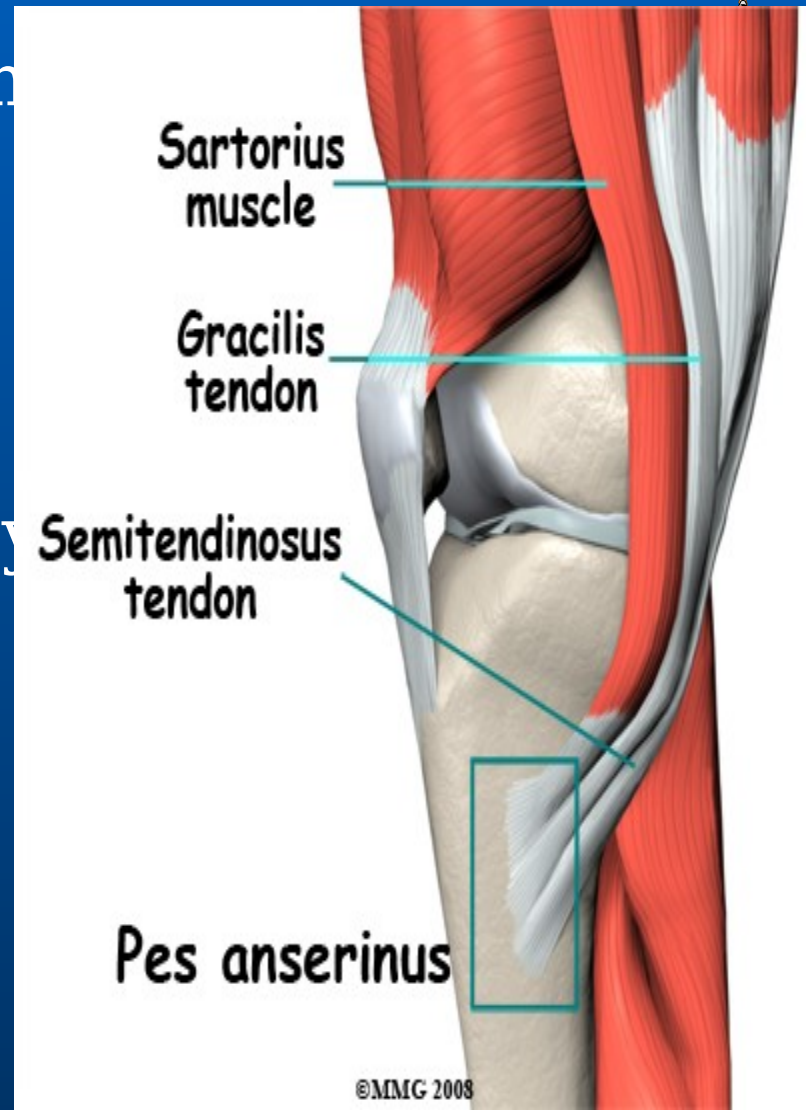
Anatomy of the Knee



# Pes Anserine Injection



- Tendons coalesce 2-4 cm below joint line, ANTERO-MEDIAL
  - Sartorius, Gracilis, Semitendinosus
- Bursitis vs Tendinopathy
- Meds: 2cc lido plus:
  - 10 mg triam OR
  - 2 mg beta/dexa



# Pes Anserine Injection



- Pt supine, knee straight
- Point of max tenderness
- Insert perpendicular to skin
- Touch bone, withdraw 1mm, inject





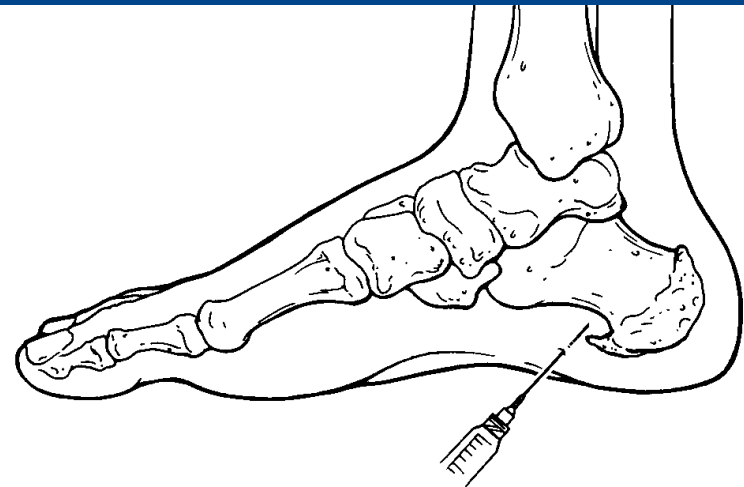
# Ankle and Foot Injections

# Plantar

## • Fascia

### • Indications:

- Recalcitrant pain
- Needle size and dosage:
  - 25 to 27 gauge, 1"
  - 1ml of Lido w/ 10 mg Triam OR 2 mg beta/dexa
- Technique
  - Medial/plantar approach
  - Inject into fascia
  - Peppering probably OK



# Morton's Neuroma

(perineural fibrosis of an interdigital nerve)

- **Indications:**

- Pain refractory to conservative treatment

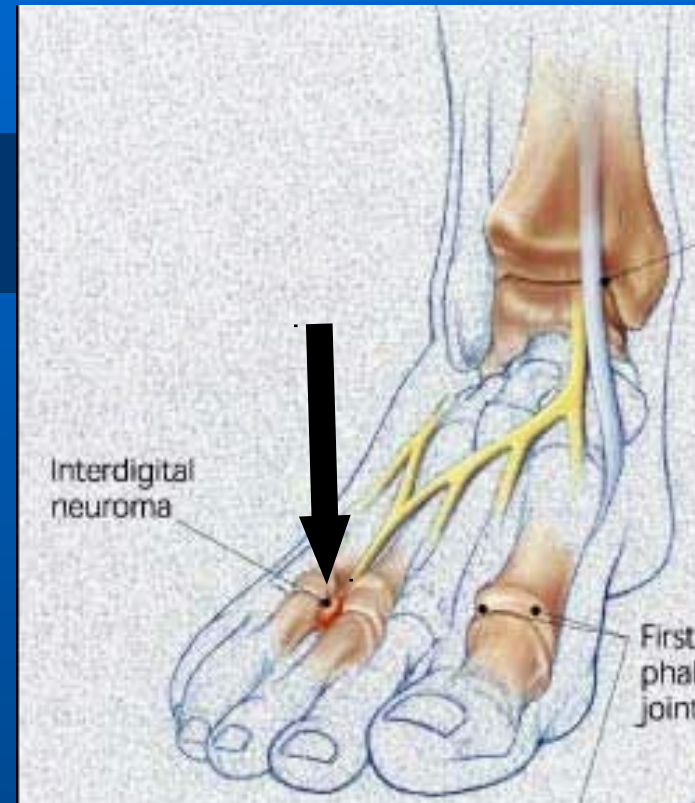
- **Needle size and dosage:**

- 25 to 27 gauge 1 inch needle
  - 0.5ml of Lido w/ 10 mg Triam OR 2 mg beta/dexa

- **Technique**

- Inject between MT heads, go half-way thru

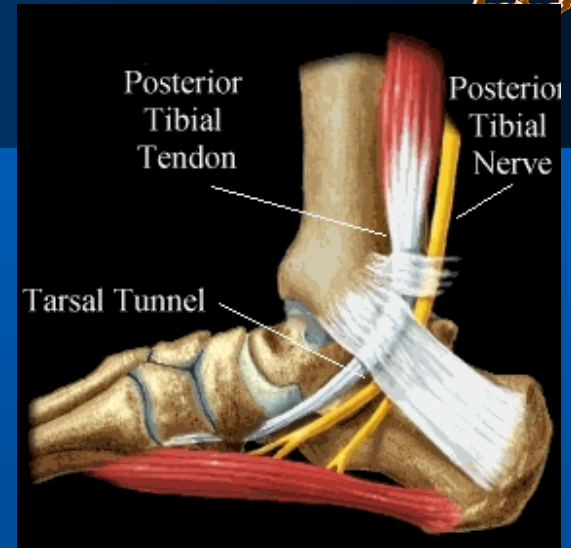
Aspirate to r/o vascular placement





# Tarsal Tunnel Syndrome

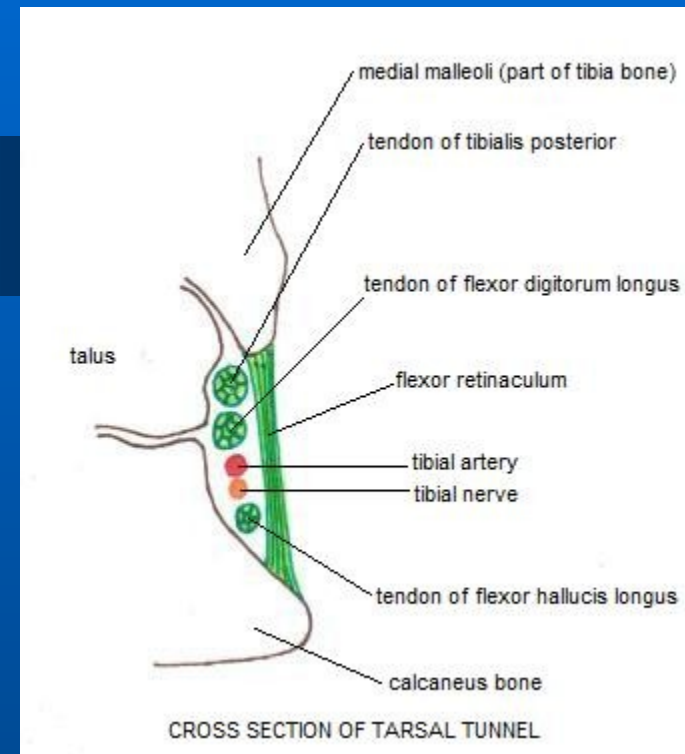
- Indications:
  - Diagnostic
  - Persistent Pain
- Needle size and dosage:
  - 25 to 27 gauge 1 inch needle
  - 0.5ml of Lido w/ 10 mg Triam OR 2 mg beta/dexa
- Technique



# Tarsal Tunnel Injection

## Technique

- Prox to distal, 30d angle
- Stay close to Malleolus to avoid NV bundle
- Inject; fluid should distribute easily



# Ankle Joint

- Indications:

- Pain from OA

- CSI, Visco

- Needle size and dosage:

- 25 to 27 gauge 1 ½" needle

- 1-2 ml of Lido w/ 20 mg Triam  
OR 4 mg beta/dexa

- Technique

- Anterioror, lat to TibAnt tendon



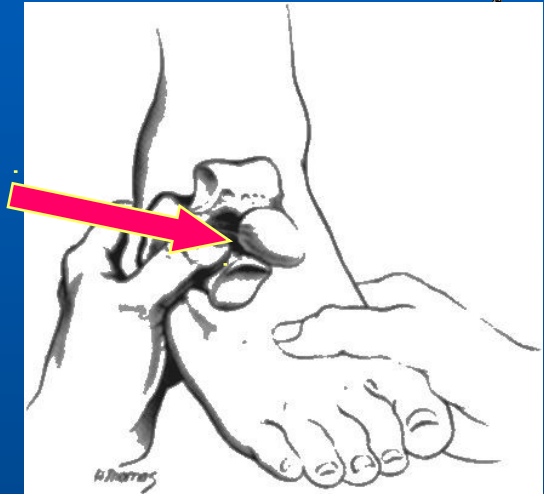
Anterior  
Tibial  
Tendon

# 1<sup>st</sup> MTP

- **Indications:**
  - Dx: Aspiration- r/in Gout
  - Tx: pain from OA
- **Needle size and dosage:**
  - 25 to 27 gauge 1 inch needle
  - 1 ml Lido w/ 10 mg Triam  
OR 2 mg beta/dexa
- **Technique**
  - Distract joint
  - Enter dorsally or medially



# Sinus Tarsi Syndrome



- **Indications:**

- Chronic pain in Sinus Tarsi from unhealed subtalar ligaments

- **Needle size and dosage:**

- 25 to 27 gauge 1" needle
- 1-2 ml of Lido w 10 mg Triam OR 2 mg bexa/dexa

- **Technique:**

- 2 cm distal to Lateral Malleolus
- Needle perp to skin